

## TELEPHONE PERSONAL INFORMATION MANAGER

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

5 This invention relates generally to telephonic communications and, more particularly, to a personal information manager that organizes telephone call message responses in reaction to such factors as the calling party identity, time of day, and activity level.

#### 2. Description of the Related Art

10 In most state of the art telephones, including mobile station and landline telephones, the identity of the calling party can be established before the telephone is answered. The telephones have access to the current time through the same mechanism (Caller ID). Telephones also have programmable ring tone features. Although a telephone can be 15 individually customized using these mechanisms, there are few features available to permit a telephone to react in response to the identity of the calling party or the time of day. Where these features are available, at least one user-directed or manual step is required in the process. For example, few methods exist to conveniently, automatically, or 20 programmably modify the phone's alerting methods. Neither are there programmable methods of redirecting voice mail based on the user's preferences or calendar entries. Instead, the change of the alerting method must be manually performed each time by the user. The redirection to a voice mail system can typically only be achieved when the 25 telephone is in use, or not answered within a certain number of rings. No

convenient method exists for modifying the voice mail system to respond differently for different callers or different times of day.

It would be advantageous if a telephone user could program a telephone to respond differently for different situations.

5 It would be advantageous if a telephone could be programmed to respond uniquely to each caller.

It would be advantageous if a telephone could be programmed to respond in reaction to the time of day.

10 It would be advantageous if a telephone could modify its behavior and message response in reaction to external events, without immediate user intervention. To that end, it would be advantageous if a telephone's audible ringer could be silenced during times previously selected by the user. Also, it would desirable if calls could be blocked from a first class of identified calling parties, while other calls permitted  
15 to ring through from a second group of identified calling parties.

## SUMMARY OF THE INVENTION

Accordingly, a mobile station telephone is provided with data transfer and caller identification capabilities, that is able to modify its response to incoming calls based on external events, such as calendar entries, and the identity of the calling party. A software module, external or internal to the mobile station, with appropriate memory serves as a personal information manager (PIM). The PIM modifies the mobile station's method of alerting the user of an incoming call, depending on the user's preferences. These preferences can be selected by the phone's user through a user interface that is external or embedded into the phone by

combining basic settings regarding alerting and answering methods, such as audible or vibrating answer, voice mail, or busy signal. The user interface information database acts as a calendar, time management system, or secretary.

5           A method is also provided for a mobile station to control the receipt of messages. The method comprises: creating a group of message responses; identifying a calling party; selecting a message response from the group of message responses, in reaction to the identity of the calling party; and, supplying the selected message response.

10          In some aspects of the invention, the message response groups change in reaction to external factors, such as the time of day, communication activity level, or manual selection. Then, the method further comprises: creating a plurality of message response groups; and, selecting a message response group from the plurality of message 15 response groups.

Creating a group of message responses includes creating a hierarchy of message responses. Then, the method further comprises: creating a hierarchy of priority groups; inserting calling party identities into the priority groups; creating a matrix of the priority group hierarchy 20 cross-referenced to the message response hierarchy; in response to identifying a calling party, locating the calling party in a priority group; and, selecting a message response in reaction to locating the priority group.

## BRIEF DESCRIPTION OF THE DRAWING

Fig. 1 is a schematic block diagram illustrating the present invention system for controlling the receipt of messages in a wireless communications network.

5 Fig. 2 is a block diagram illustrating a priority group list, such as may be stored in memory for use by the mobile station of Fig. 1.

Fig. 3 is a block diagram illustrating a priority group hierarchy cross-referenced with a message response hierarchy, to form a priority group-message response matrix.

10 Fig. 4 illustrates a program used to select a priority group-message response matrix.

Fig. 5 is a flowchart illustrating the present invention method for a mobile station to control the receipt of messages in a wireless communications network.

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## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Fig. 1 is a schematic block diagram illustrating the present invention system for controlling the receipt of messages in a wireless communications network. The system 10 comprises a mobile station 12 having a wireless communications port to accept calls on line 14, through antenna 16. The mobile station 12 including a microprocessor 18, a software application of machine executable instructions 20, and a memory 22 with a group of message responses. The mobile station 12 identifies a calling party 24, communicating through the wireless network, selects a message response from the group of message responses in memory 22, in

reaction to the identity of the calling party 24. As explained in more detail below, many of the elements identified with the mobile station can be located, and their functions performed, at a remote site.

The mobile station 12 includes an audible indicator 26 for 5 audio alerting, a vibrator indicator 28 for vibration alerting, and a visual display indicator 30 for visual alerting. Thus, the possible message responses include alerting, not alerting, responding with a busy signal, not alerting and recording the message, and forwarding the call to another telephone. Other responses are also possible and the present 10 invention is not necessarily limited to the above-mentioned examples.

One feature of the present invention permits the message response group stored in memory 22 to be a message response group selected from the plurality of message response groups. That is, different message response groups can exist for different situations. For example, 15 the mobile station can be programmed to have a different set of responses in the morning than it has in the afternoon. The message response group, stored in memory 22, is selected in reaction to factors including the time of day, communication activity level, and manual selection. A keyboard 30 creating a signal with configuration of keys, and/or a switch (not shown) can enable the mobile station 12 to manually trigger a change in 20 the stored message response group.

Fig. 2 is a block diagram illustrating a priority group list, such as may be stored in memory for use by the mobile station of Fig. 1. The priority group list includes a plurality of priority groups. Priority 25 groups one, two, and  $n$  are specifically shown, where the dotted lines separating priority group two from priority group  $n$  are intended to

represent any additional number of priority groups in the list. The present invention is not limited to any particular number of priority groups. Certain calling party identities, such as Bob Jones or selected telephone exchange numbers, are assigned to priority group one. The list 5 is organized so that the entities in priority group one have a higher priority than the entities in priority group two, and group two has a higher priority than group  $n$ .

In some aspects of the invention, the wireless communication network provides Caller ID services. Then, the mobile station 12 10 identifies the calling party using the Caller ID services provided by the wireless communications network. Alternately, the mobile station software application 20 identifies a calling party from factors including the complete phone number, local area exchange, area code, the calling party having an unknown number, and the calling party having a blocked 15 number. For example, an unknown or blocked ID number may be put in the lowest priority group  $n$ . Certain local exchange numbers or area codes may be given higher priority than other numbers or Caller IDs.

Fig. 3 is a block diagram illustrating a priority group hierarchy cross-referenced with a message response hierarchy, to form a 20 priority group-message response matrix. The mobile station software application 20 (see Fig. 1) creates a matrix of the priority group hierarchy cross-referenced to message response hierarchy. First, the software application locates the calling party in a priority group. In response to the calling party being identified, a message response is selected in reaction to 25 locating the priority group. For example, returning briefly to Fig. 2, the caller is identified as Bob Jones. Therefore, the calling party is located in

priority group one. Returning to Fig. 3, since the caller is located in priority group one, response A is selected. Response A might be to alert the mobile station user using the audible alert.

In some aspects of the invention, the priority group-message response matrix includes an override message response. This is a message response that a selected group of callers is able to trigger, bypassing the normal process of locating the caller in a priority group and providing a message response in reaction to the priority group. The mobile station software application provides the override message response, which bypasses the message response that would normally have been selected in reaction to locating the priority group. As shown in Fig. 3, the message group X override response is response A, which may be to ring the call through using the audible alert. Returning to Fig. 2, an override priority group is shown including calling parties with the authority to trigger the override message response. Further, a code word identity is shown so that the override response can be triggered when the mobile station receives a calling party security code. Thus, override priority calling parties such as Wanda Sims, who are normally given message response n, can enter a code word or supply some other kind of stimulus to trigger the override response. In some aspects of the invention even an unknown or unclassified caller is permitted override priority as long as the security code is provided.

In some aspects of the invention, other message response bypasses are available. Returning to Fig. 1, the software application 20 shows the identity of the calling party on the display 30, regardless of the message response selected. The display presents the call to the user in an

unobtrusive manner, so that the user can bypass the automatic mechanism which provides a message response in reaction to locating the caller identity in a priority group. Other non-obtrusive alert mechanisms could also be used, such as a single vibration pulse or a single ring.

5           In some aspects of the invention, the software application 20 adds special identities to the hierarchy of priority groups (see Fig. 2) and cross-references the special identities to message responses (see Fig. 3). The software application locates a calling party identity in the special identities, for example Henry Lee is located as a special identity. A  
10          special identity message response is then given in reaction to locating the special identity, prior to locating the calling party identity in a priority group and providing a message response in the normal manner of the invention. This feature may be used for temporary circumstances. For example, if the mobile station user knows that Henry Lee will be on  
15          vacation for the next two weeks, an assumption can be made that any calls received from Henry Lee in that two week period will be urgent. Therefore, Henry Lee will receive a response A instead of the normal process response B. After the two week vacation, Henry Lee can be removed as a special identity and will receive the message response  
20          accorded a caller located in priority group two. This features saves the user from having to edit the caller identities in the priority groups.

As shown in Fig. 3, a memory can be maintained for a plurality of message response hierarchies. Message response group X, message response group Y, and message response group Z are shown, but  
25          the invention is not limited to any particular number. As a result, a priority group-message response matrices are formed, where the priority

group hierarchy is cross-referenced against each of the plurality of message response hierarchies. Therefore, a particular priority group-message response matrix must first be identified for use in cross-referencing the located priority group. The matrix to be used is  
5 programmable by the mobile station user.

Fig. 4 illustrates a program used to select a priority group-message response matrix. For example, the user may select the message response group Y responses from 7 AM to 8 AM for the morning commute, and between 12 PM and 6 PM for lunch, afternoon meetings, and the  
10 commute home. Message response group X can be selected from 8 AM to 12 PM for the normal office routine, and message group Z selected from 6 PM to 7 AM, when the user is home.

Returning to Fig. 1, in one aspect of the invention, the mobile station memory 22 maintains the priority group-message response matrices, and the software application 20 determines which matrix is the  
15 be used. Alternately, the priority group-message response matrices can be maintained at a remote memory 60 having a port to transmit wireless communications with the mobile station. The remote memory 60 can be a service offered by the wireless service provider, or a computer and  
20 telephone combination that the mobile station user maintains at home or at work.

Then, the mobile station 12 port accepts a priority group-message response matrix transmitted by the remote memory 60 for storage in the mobile station memory 22. Thus, the mobile station need only store the  
25 priority group-message response matrix that is currently in use, so that the mobile station memory and software functions can be simplified.

For example, in some aspects of the invention, the mobile station software application 20 periodically requests the current priority group-message response matrix using a wireless transmission through the communications port. The remote memory 60 transmits the current priority group-message response matrix to the mobile station 12 in response to the request. The mobile station 12 may request the priority group-message response matrix by transmitting a wireless message selected from the group including short message service (SMS) and general message service. Likewise, the remote memory 60 transmits the priority group-message response matrix by wireless communication messages selected from the group including SMS and general message service. A general message service can include data network subscriber protocols such as WAP and HTTP.

Alternately, a switch 30 or keystroke combination may be used to manually request the transmission of the priority group-message response matrix from the remote memory 60. In another aspect, the remote memory 60 is accessible via an Internet address, to receive requests for priority group-message response matrix updates. Then, the mobile station software application 20 includes a lightweight browser to request the current priority group-message response matrix, via a wireless communications from the remote memory having the Internet address.

The mobile station browser 20 can also be used to access the remote memory 60 for the purpose of editing the matrices, modifying the relationships between a priority group and a message response, or the relationship between a calling party identity and a priority group.

Alternately, it may be easier to perform edits of the priority group-message response matrices in remote memory 60 through a landline Internet connection to a personal computer.

Further, a message response software application 62 and 5 microprocessor 64 can be stored and maintained at the remote site, in some aspects of the invention. Thus, the matrices are stored in remote memory 60. The remote software application 62 selects the matrix to be used, locates the identified caller in a priority group, and provides a message response in reaction the priority group. The remote site software 10 application 62 provides a signal to the mobile station 12 that communicates the selected message response. In some aspects the remote site also identifies the caller. Alternately, the mobile station 12 supplies the calling party identity to the remote site.

Although the message control and response system of the 15 present invention has been explained above in the context of a wireless communications network, it is also applicable to landline telephones. In a landline system, the various software, memory, and display functions could be enabled in a mechanism connected to the telephone. Alternately, the handset could be built to incorporate some of the control and response 20 functions. Further, the landline service provider could enable some, or all, of the message response control functions.

Fig. 5 is a flowchart illustrating the present invention method for a mobile station to control the receipt of messages in a wireless communications network. Although the method is depicted as a sequence 25 of numbered steps for clarity, no order should be inferred from the numbering unless explicitly stated. Step 100 is the start of the method.

Step 102 creates a group of message responses. Creating a group of message responses in Step 102 includes creating message responses selected from the group including audio alerting, visually alerting, vibration alerting, not alerting and responding with a busy signal, not 5 alerting and recording the message, and forwarding the call to another telephone. Step 104 identifies a calling party. In some aspects the wireless communication system provide Caller ID services. Then, identifying the calling party in Step 104 includes using the Caller ID service to identify the calling party. Alternately, identifying a calling 10 party includes determining a calling party identity from factors including the complete phone number, local area exchange, area code, unknown number, and blocked number. Step 106 selects a message response from the group of message responses, in reaction to the identity of the calling party. Step 108 supplies the selected message response.

15 Some aspects of the invention include further steps. Step 103a creates a plurality of message response groups. Step 103b selects a message response group from the plurality of message response groups. As discussed above in the explanation of Figs. 1-4, different message 20 response groups are created for use in different times of the day, or in different circumstances. That is, selecting a message response group from the plurality of message response groups in Step 103b includes selecting a message response group in reaction to factors including the time of day, communication activity level, and manual selection.

Creating a group of message responses in Step 102 typically 25 includes creating a hierarchy of message responses. Then, the method comprises further steps. Step 102a creates a hierarchy of priority groups.

Step 102b inserts calling party identities into the priority groups. Step 102c creates a matrix of the priority group hierarchy cross-referenced to message response hierarchy. Then, selecting a message response from the group of message responses in Step 106 includes sub-steps. Step 106a  
5 locates the calling party in a priority group. Step 106b selects a message response in reaction to locating the priority group.

Some aspects of the invention include further steps. Step 105 receives a calling party security code or other means of overriding the normal message response. In response to receiving the security code, Step 10  
10 110 provides an override message response (regardless of the message response selected in Step 106).

In some aspects of the invention the mobile station includes a display mechanism or some other non-obtrusive alerting mechanism. Then, a further step, Step 112 shows the identity of the calling party identity, regardless of the message response selected in Step 106.  
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In some aspects of the invention, creating a hierarchy of priority groups in Step 102a includes adding special identities to the hierarchy of priority groups. Creating a matrix of the priority group hierarchy cross-referenced to message response hierarchy in Step 102c  
20 includes cross-referencing the special identities to message responses. Then, selecting a message response from the group of message responses in Step 106 includes other sub-steps. Step 106c, prior to locating a calling party identity in a priority group, locates the calling party identity in the special identities. Step 106d selects a message response in reaction to  
25 locating the special identity.

Creating a plurality of message response groups in Step 103a includes creating a plurality of message response hierarchies. Then, the method includes a further step. Step 103a(1) creates matrices of the priority group hierarchy cross-referenced to each of the plurality of message response hierarchies. Then, selecting a message response group from the plurality of message response groups in Step 103b includes identifying the priority group-message response matrix to be used for cross-referencing the priority group in which the calling party identity is located.

In some aspects of the invention a further step, Step 114 edits the matrices to modify a the relationship between a priority group and a message response. Step 116 edits the matrices to modify the relationship between a calling party identity and a priority group.

When the mobile station includes a local memory, a microprocessor, and a software application of microprocessor instructions, the method comprises further steps. Step 103a(2) loads the selected priority group-message response matrix into the local memory. Then, Step 106a includes using the software application to locate the calling party in a priority group stored in the local memory. Step 106b selects a message response stored in the local memory.

In some aspects of the invention, the control and response functions are all substantially embedded in the mobile station. Then, a further step, Step 102d loads the priority group-message response matrices into local memory. Selecting a message response group from the plurality of message response groups in Step 103b includes using the

software application to select a priority group-message response matrix from memory for use in cross-referencing the located priority group.

Alternately, a remote memory is used in the message control and response function. Then, Step 102d loads the priority group-message response matrices into the remote memory. Loading the priority group-message response matrix into local memory includes transmitting the message by wireless communication messages selected from the group including short message service (SMS) and general message services, such as WAP and HTTP data network subscriber protocols. Then, selecting a message response group from the plurality of message response groups in Step 103b includes loading a priority group-message response matrix into local memory from the remote memory for use in cross-referencing the located priority group.

In some aspects of the invention selecting a message response group from the plurality of message response groups in Step 103b includes the mobile station periodically requesting that the current priority group-message response matrix to be loaded into local memory from the remote memory, for use in cross-referencing the located priority group. Alternately, preceding the loading of the priority group-message response matrix into local memory, Step 102d includes the mobile station manually sending a request that the priority group-message response matrix be transmitted.

In some aspects of the invention, the remote memory has an Internet address. Then, selecting a message response group from the plurality of message response groups in Step 103b includes accessing the Internet address to load the priority group-message response matrix into

local memory. When the mobile station includes a software browser application, selecting a message response group from the plurality of message response groups in Step 103b includes using the mobile station browser to access the Internet address through a wireless communications message.

In some aspects of the invention, editing the matrices to modify the relationship between a priority group and a message response in Step 114 includes accessing the remote memory through the Internet address. Likewise, editing the matrices to modify the relationship between a calling party identity and a priority group in Step 116 includes accessing the remote memory through the Internet address.

In some aspects of the invention the software application, microprocessor, and memory are located at a remote site. Then, Step 102d loads the priority group-message response matrices into remote memory. Selecting a message response group from the plurality of message response groups in Step 103b includes using the remote site software application to select a priority group-message response matrix from remote memory for use in cross-referencing the located priority group. Supplying the message response in Step 108 includes supplying the message response to the mobile station from the remote site.

The system and method of the present invention allows a telephone to modify its behavior and response to external events without immediate user intervention. This automatic customization permits more efficient use of the telephone. One application is the automatic silencing of the phone's audible ringer during times that have been previously selected by the user. Other applications permit the blocking of only

certain callers during meetings, and other activities, that may warrant a modified response to incoming calls. Although examples of the present invention have been given in the context of a wireless communications network, the invention is equally applicable to landline and Internet telephones systems. Most of the examples depict the invention systems as being co-located with the mobile station. Some, or all, the control and message response functions can be performed at a site remote from the mobile station, however, such as by the service provider. Other variations and embodiments will occur to other skilled in the art in light of the above-mentioned examples.

**WE CLAIM:**